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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/897,910	07/03/2001	Richard Stirling-Gallacher	282651US8X	1395

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EXAMINER	
DEAN, RAYMOND S	

ART UNIT	PAPER NUMBER
2618	

NOTIFICATION DATE	DELIVERY MODE
04/20/2009	ELECTRONIC

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary	Application No.	Applicant(s)	
	09/897,910	STIRLING-GALLACHER ET AL.	
	Examiner	Art Unit	
	RAYMOND S. DEAN	2618	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *10 February 2009*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *23-31 and 33* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *23-31 and 33* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *03 July 2001* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed February 10, 2009 have been fully considered but they are not persuasive.

Regarding Applicants' assertion on Page 6, 1st Paragraph of the remarks- "However, these statements do not teach or suggest what is actually recited … namely that a filter is selected from among …".

Khayrallah, as detailed in the Office Action dated October 10, 2008, teaches a filter being adaptively selected from a set of filters on the basis of an interference reference value, which is the adjacent channel interference ratio. Mitra teaches in Col. 2 lines 6 – 7, lines 18 – 22, lines 39 – 40 channel estimation and that the filter takes into account the Doppler spread interference. Since the filter takes the Doppler spread interference into account the filter coefficients that make up said filter take said Doppler spread interference into account. The Doppler spread interference occurs at a particular frequency thus said Doppler spread interference comprises a Doppler frequency. The filter coefficients thus are ultimately based on the Doppler frequency. Additionally, the Doppler spread interference and thus the Doppler spread frequency is applied to the transmission channel and thus to the data symbols that are transmitted via said transmission channel. The channel impulse response (CIR), which is the channel estimation of the data transmitted via said channel, takes into account the characteristics of the channel such as the Doppler spread interference and enables the

determination of the filter coefficients. Since the filter coefficients are based on the CIR set forth above said coefficients are based on a Doppler frequency of a data symbol to be channel estimated. Mitra thus reads on the limitation in question.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 23 – 31, 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Li (US 6,654,429) in view of Khayrallah et al. (6,047,171) and in further view of Mitra et al. (5,533,063).

Regarding Claim 23, Li teaches a device for receiving signals in a wireless cellular orthogonal frequency division multiplex (OFDM) system, in which data symbols are transmitted in frequency subcarriers and timeslots (Figure 2, Col. 3 lines 30 – 39, the OFDM signal x[n,k], which comprises data symbols is embedded with pilot symbols, OFDM comprises frequency subcarriers and timeslots), comprising: a channel estimator configured to perform a channel estimation on the basis of received pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21); and a filter configured to perform a channel estimation for data symbols between pilot symbols (Cols. 3 lines 30 – 39, 4 lines 35 – 67, 5 lines 1

– 21, the OFDM signal being embedded with pilot symbols renders a scenario wherein the data symbols are between pilot symbols), an estimated carrier being a wanted carrier power value at a frequency subcarrier and a timeslot of a data symbol to be channel estimated (Cols. 4 lines 35 – 67, 5 lines 1 – 21, the OFDM system of Li is a wireless system, typical wireless systems transmit signals comprising carriers, said carriers are transmitted at a particular power, which is the wanted carrier power).

Li does not teach said filter being adaptively selected from a set of filters on the basis of an interference reference value and a Doppler frequency of the data symbol to be channel estimated, said channel estimation being based on an estimated carrier to interference value ratio.

Khayrallah teaches said filter being adaptively selected from a set of filters on the basis of an interference reference value and an estimated carrier to interference value ratio (Col. 7 lines 9 – 31, the adjacent channel interference value in the carrier to adjacent channel interference ratio is the interference reference value).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the filtering method of Khayrallah in the system of Li for the purpose of enabling optimum performance of the despite the effects of adjacent channel interference.

Mitra, which also teaches a system wherein the filtering takes into account the Doppler frequency, teaches selecting a filter based on a Doppler frequency of the data symbol to be channel estimated (2 lines 6 – 7, lines 18 – 22, lines 39 – 40, See also Response To Arguments above).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above feature of Mitra in Li in view of Khayrallah as an alternative means for achieving the predictable result of filtering that takes into account the Doppler frequency.

Regarding Claim 27, Li teaches a method for channel estimation in a wireless cellular orthogonal frequency division multiplex (OFDM) system, in which data symbols are transmitted in frequency subcarriers and timeslots (Figure 2, Col. 3 lines 30 – 39, the OFDM signal x[n,k], which comprises data symbols is embedded with pilot symbols, OFDM comprises frequency subcarriers and timeslots), comprising: performing a channel estimation on the basis of received pilot symbols (Cols. 4 lines 35 – 67, 5 lines 1 – 21); and performing, by a filter, a channel estimation for data symbols between pilot symbols (Cols. 3 lines 30 – 39, 4 lines 35 – 67, 5 lines 1 – 21, the OFDM signal being embedded with pilot symbols renders a scenario wherein the data symbols are between pilot symbols), an estimated carrier being a wanted carrier power value at a frequency subcarrier and a timeslot of a data symbol to be channel estimated (Cols. 4 lines 35 – 67, 5 lines 1 – 21, the OFDM system of Li is a wireless system, typical wireless systems transmit signals comprising carriers, said carriers are transmitted at a particular power, which is the wanted carrier power).

Li does not teach said filter being adaptively selected from a set of filters on the basis of an interference reference value and a Doppler frequency of the data symbol to be channel estimated, said channel estimation being based on an estimated carrier to interference value ratio.

Khayrallah teaches said filter being adaptively selected from a set of filters on the basis of an interference reference value and an estimated carrier to interference value ratio (Col. 7 lines 9 – 31, the adjacent channel interference value in the carrier to adjacent channel interference ratio is the interference reference value).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the filtering method of Khayrallah in the system of Li for the purpose of enabling optimum performance of the despite the effects of adjacent channel interference.

Mitra, which also teaches a system wherein the filtering takes into account the Doppler frequency, teaches selecting a filter based on a Doppler frequency of the data symbol to be channel estimated (2 lines 6 – 7, lines 18 – 22, lines 39 – 40, See also Response To Arguments above).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to use the above feature of Mitra in Li in view of Khayrallah as an alternative means for achieving the predictable result of filtering that takes into account the Doppler frequency.

Regarding Claims 24, 28, Li in view of Khayrallah and in further view of Mitra teaches all of the claimed limitations recited in Claims 23, 27. Li further teaches a carrier to interference ratio at the frequency subcarrier and the timeslot of the data symbol to be channel estimated (Cols. 4 lines 35 – 67, 5 lines 1 – 21, typical OFDM systems comprise timeslots, channel estimation takes into account various characteristics of a channel such as adjacent and co-channel interference, along with

noise and background effects, the effects of said interference is quantized using the carrier to interference ratio (CIR) thus channel estimation takes into account the CIR). Khayrallah teaches means for selecting said filter based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

Regarding Claims 25, 29, Li in view of Khayrallah and in further view of Mitra teaches all of the claimed limitations recited in Claims 24, 28. Li further teaches a frequency filter that is selected on the basis of a difference vector between frequency subcarriers adjacent to the frequency subcarrier of the data symbol to be channel estimated (Col. 2 lines 36 – 45, 2-D filter comprises a frequency filter, said 2-D filter comprises the frequency index vector and the time index vector, which are difference vectors).

Regarding Claims 31, 33, Li in view of Khayrallah and in further view of Mitra teaches all of the claimed limitations recited in Claims 24, 27. Li further teaches a frequency filter that is selected on the basis of a difference vector between frequency subcarriers adjacent to the frequency subcarrier of the data symbol to be channel estimated (Col. 2 lines 36 – 45, 2-D filter comprises a frequency filter, said 2-D filter comprises the frequency index vector and the time index vector, which are difference vectors). Khayrallah teaches means for selecting said filter based on the estimated carrier to interference ratio (Col. 7 lines 9 – 31).

Regarding Claims 26, 30, Li in view of Khayrallah and in further view of Mitra teaches all of the claimed limitations recited in Claims 24, 28. Li further teaches a time filter (Col. 2 lines 36 – 45, 2-D filter comprises a time filter). Mitra further teaches

means for selecting selects a filter based on a Doppler frequency of the estimated channel (Col. 2 lines 39 – 40, the filter takes into account the Doppler characteristics).

Conclusion

4. Any inquiry concerning this communication or earlier communications from the examiner should be directed to RAYMOND S. DEAN whose telephone number is (571)272-7877. The examiner can normally be reached on Monday-Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Edward F. Urban can be reached on 571-272-7899. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Raymond S Dean/
Examiner, Art Unit 2618
Raymond S. Dean
April 14, 2009